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General Notes.

GEOGRAPHY AND TRAVELS.[1]

Africa.—GARENGANZE.—Garenganze, the land ruled by Mshidi, between Lakes Mwero and Tanganyika, has recently been visited both from the east and from the west. Mr. Alfred Sharpe, proceeding from Lake Tanganyika, discovered west of that lake and east of Mwero another Mwero into which run the rivers Mkabe, Mwambezi, the Choma from the north, and the Chisela from the north-east. This lake is now partially desiccated, and consists of an extensive salt-marsh with several pools of water, including a large central one about fifteen miles long by ten wide. The former outlet of this lake was by the Movu river-bed to the Kalongwizi River, a feeder of Lake Mwero. Kazembe, the powerful chief who resides on the Luapula, above Lake Mwero, though very polite to the traveller, would not permit him to cross because of his enmity to Mshidi, so that, finding all attempts useless, Mr. Sharpe was compelled to retrace his steps to Abdallah's near the salt-marsh, and from thence to make his way westward round the north of Lake Mwero. Abdallah is an agent of the famous Tippo Tib, and bears sway eastward as far as Kabunda, near Tanganyika. The highest point between Chipenbiri, on the level of the swamp, (3050 feet) and Lake Mwero, is at an elevation of 3850 feet. The eastern watershed of the northern part of Mwero is not more than six to eight miles from the shore, and that lake is 2900 feet above the sea. The streams Luao and Luchinda flow into the lake from the north, and Mpweto's town, east of the Luabula, is subject to Abdallah. The Luapula, at its point of exit from the lake, is of less volume than above. Beyond the lake rises one of those plateaux so frequent in Africa, and the country beyond this, after passing Chuako (subject to Mpweto), belongs to Mshidi. The Luvule River falls into the Luapula not far from its exit, and the next river reached after crossing the watershed is the Luvula, an affluent of the Lufira, into which it falls a few miles above the junction of the Lufira with the Likulwe, from its left bank. The Lufira itself like the Lapula, is a tributary of the Congo. The soil of Garenganze is rich, but the country shadeless. Mshidi is now an old man; originally he was a trader from the Wa-Nyamyezi, but became chief. He has many wives. On his return by the same route that he had entered, Mr. Sharpe explored the salt-swamp, and found it rich in large game. Lake Bangweolo is placed at 4260 feet above sea-level; thus, as the sources of the Chambezi are only 4400 feet, the fall of that river must be very slight. Our traveller states that the practice of maiming the person is rife among the natives southwest of Tanganyika, among whom the Wa-Wemba are perhaps the worst in this respect.

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[1] This department is edited by W. W. Lockington, Rugby, England.

The visitor to Mshidi from the west, was Lieutenant Paul Le Marinel, the service of the Congo State. The route necessitated the crossing of the Sankuru, Lomami, and Lualaba basins. The first is situated further to the east than has before been supposed, and the travellers discovered the Luembe, an affluent of the Lubilash, itself a tributary of the Sankuru. The source of the Lomami was found in 8° 45′ S. and 24° 55′ E. long; the river occupies a long narrow basin, running almost due north and south for 750 miles. During the whole of this course it does not stray more than a degree from a straight course, and it receives only two important tributaries, the Lurimbi and the Lukassi. South of the plateau in which the Lomami rises, is a district named Samba, with a most European aspect. Marinel gives Bunkeia as the name of Mshidi's capital. East of the Lualaba the country is mountainous.

AFRICAN NOTES.—One of the chief discoveries of Dr. Stuhlmann, who last year accompanied Emin Pasha into his old Equatorial province, was the river Kifu, which is stated to have a course of 250 miles before it falls into Lake Albert-Edward, and is thus the most southerly source of the Nile yet known. Dr. Stuhlmann started from Kafure, on the Muta, a tributary of the Kangere, on the west shore of Victoria Nyanza, descended to the Kagere, then crossed the Mpororo Mountains to the Ruchuru and to Lake Albert-Edward (Mwutanzige) at Vichumbi (0° 44′ S., 2850 feet). The country to the south was a vast savannah with mountains in the distance, among which Kisigali, 13,000 feet, seems to be the highest. Beyond this is the active volcano of Virungo Viagongo. Along the west shore of the lake the mountains approach almost to the edge. From Karevia he attempted to ascend the snowy mountain (probably a peak of Ruwenzori), and reached 12,500 feet. He found bamboo and grasses from 3850 to 5350 feet; colocasia beans, grass, and the upper settlements up to 6700; then deciduous forests with Erica and bamboo to 8530 feet, followed by a belt of Erica and Vaccinium to 11,800, above which, to the snow line at 13,000 feet, the vegetation was reduced to mosses, lichens and

Senecio. The plateau west of Lake Albert is known as Lendu. He reports a considerable shrinkage of the waters of the Albert Nyanza since it was first discovered, so that islands have become peninsulas.

M. Crampel and his party was set upon by Snoussi and his fanatical Arabs, who killed all the whites, asserting that they had no business in the country, but did not hurt the Senegalis who composed his escort. M. Nebout, who was coming up, carried back the sad news, and the fate of Crampel was avenged by M. Dybovski, who entered the country with a considerable force.

On the Mobangi, Captain Van Gele has "forged the last link" between that river and the Welle, which is thus definitely included in the Congo basin.

The Kong Mountains of the maps have been found to have no actual existence, proving to be but an elevated watershed.

The Italians are endeavoring to explore Somaliland, but some of their recent expeditions have not been successful. Captain B. de Vesme, however, passed from Berbera by Harrar, over the waterless plains of Milmil to the rivers Kishen and Amaden, and then to the upper course of the Webbe.

America.—THE ECUADORIAN ANDES.—Dr. Wolf, who has devoted much time to the study of the Andes of Ecuador, describes them as consisting of two ranges, connected at intervals by cross chains, and thus enclosing basins. The eastern cordillera is as a whole more prominent, geologically older, and of greater average height than the western, the rocks of which are much more heterogeneous, while its elevation exhibit greater diversity and irregularity. A porphyritic cross ridge at the mountain knot of Acayana and Guagrauina has much gold-bearing quartz, and is the richest mining district of the country. From this the eastern cordillera continues onward, broad and lofty, into the province of Cuenca, with a wide bend, and a second cross ridge of porphyry forms the knots of Portete and Tinajillas. The lofty basin of Cuenca is one of the most beautiful in the Andes, and the chief town is situated at an altitude of 8460 feet. North of there is the irregular mountain mass of Azuay, which sends spurs in every direction, two of which reach the western cordillera. Beyond this the eastern cordillera becomes of greater extent, and rises into the gigantic volcanoes of Sangay (17,880 feet), the most active volcano in the world, Altar, or Collares (17,710 feet), and Tunguragua, (16,696 feet). Opposite to these, on the western cordillera, rises the still loftier Chimborazo (20,660 feet). Here commences a third cordillera, parallel with and geologically resembling the western range. The waters of the Lacatunga basin flow south and burst through the eastern range. The drainage of the basins of Quito and Ibarra goes to the Pacific. The western cordillera, by the Quito basin, is quite low, not more than 10,000 feet, but is raised by superimposed volcanic rock into the lofty volcanoes of Corazon, (15,804), Atacoza, (14,390) and Pichincha. The eastern cordillera is here more complicated, and bears the giant volcanoes of Cotopaxi (19,480), Sincholagua (16,360), Antisana (18,885) and Cayambe (19,450). Northward the eastern range is continued into Columbia, increasing in height and breadth, but without any volcano north of Cayambe. In the province of Quito the western range rises into the volcanoes of Cotocachi (16,295) and Yanaurai (14,000.)

Both Dr. Wolf and Mr. Whymper describe travelling in the Ecuadorian Andes as depressing in the extreme. The lower regions, up to ten thousand feet, are thickly covered with a forest, within which it rains forever, the home of fever and dysentery. The higher regions are relatively healthy, but past expression dreary, all the more or less rounded heights being covered with coarse brown olive paramo grass, and presenting quite a contrast to the picturesque ruggedness of the Alps. These bleak paramos, as the tracts 10,000 feet or more above the sea are called, are poorly populated and badly tilled, while the huts are windowless and the people in rags. Here and there are fertile valleys with forest in sheltered spots. The temperature has little variety, ranging from 39° to 46°.

Mr. Whymper describes the climate of the paramos as a perpetually wet afternoon, and speaks of Chimborazo as a long extinct volcano, and states that the existing centres of volcanic activity are Cotopaxi and Sangai. The whole of the Andes of Ecuador are, according to Dr. Wolf and Mr. Whymper, situated more to the east than they are shown on Humboldt's and other maps.

THE UCAYALI.—The Ucayali, generally considered the leading affluent of the Amazon, has been found to be navigable for 1040 miles. The junction of the Perene with the Ene forms the Tambo, and that of the Tambo with the Urubamba forms the Ucayali. The Perene, which curves westward toward the Andes, can be navigated ten miles above its junction with the Ene, while the Huallaga, a large tributary to the north, can be entered by large steamers to 100 miles from its mouth. Iquitos, on the Amazon, on the frontiers of Peru and Brazil, is 350 feet above sea level, the mouth of the Ucayali 370, that of the Tambo 800, and that of the Ene 1000 feet. The native population of the Ucayali Valley, according to Col. Church, is not more than forty thousand, and this is as many as can be supported with their modes of life. Life is not plentiful; fish are scarce in the waters, and in correlation with this, birds are not abundant. The natives cannot procure iron. The eastern slopes of the Peruvian Andes are clothed with thick forests, among which cinchona trees abound.

Asia.—THE PAMIRS.—During the last few years much has been written about the Pamir, a region the very name of which was unknown until recently. Many travellers have found their way across this now celebrated plateau, or rather congeries of plateaux, which may be considered to form the western and narrower end of the great Tibetan table-land, the knot, in fact, from which the bounding ranges of that plateau take their origin. Among its late visitors have been the Frenchmen Bonvalot, (in company with the Prince of Orleans), and Sauvergne, the Russian Grombchevsky, the Englishmen Younghusband and St. George Littledale, accompanied by his wife. The main object of the latter seems to have been the destruction of *Ovis poli*, yet they could scarcely avoid adding to our knowledge of this not readily accessible tract.

The Pamir, or rather Pamirs, for there are several, the Little Pamir, the Great Pamir, that of Tagh-dum-bash, Alichur Pamir, and Sarikol, consist of a series of flat valleys surrounded by mountains, the really lofty crests of which do not rise greatly above the level of the valley streams.

The Pamir is situated at the junction of three great empires, and the ownership of the comparatively barren region may lead to war. The lake on the Great Pamir has been named Victoria Lake, but is called by the Kirghis, Gaz Kul, a name also given to two or three other lakes. Victoria Lake is 13,980 feet above sea level, while the Khargash Pass to the north is 14,500 feet, and the Andenin Pass, between it and the Little Pamir, 15,500 feet. The Pamir River from this lake flows west into the Wakhan, which seems also to bear the name of Kala-i-Panj, and which, after its junction with the Murghab, becomes the Amu-Daria or Oxus. The Little Pamir Lake is said to be 13,850 feet above sea level, and its outlet is by the Aksu, which, after running northeast until it has rounded the Great Pamir, unites with the Aik Bailul to form the Murghab affluent of the Oxus, flowing through Roshan Valley. Between the westerly courses of the Wakhan River and the Murghab flows the Ghund-Dara, the chief sources of which seem to be Lake Yashil-Kuhl and the Alichur River—the valley of the Ghund-

Dara is known as Shignan. Littledale's encampment on the Alichur Pamir, was at a height of 13,625 feet. Lake Kara Kul, north of the Akru-Murghab, is 12,400 feet above the sea.

East of the Great and Little Pamirs are Tagh-kum-bash and Sarikol, the streams from which, among them the Markhan-su, flow into the Kashgar and Yarkand Rivers, and thus geographically fall to China, which has, in fact, raised her banner on the Sarikol plateau. The two maps which have been published in the Proc. Roy. Geog. Soc. during the past year exhibit differences in the course of these affluents.

The important range of the Hindu Kush separates the Chitral and Hunza district from the Pamir and more northern valleys. This range is crossed by the extraordinary depression, two to three miles wide, known as the Baroghil Pass (12,480 feet). Through Chitral Valley flows the Yarkhun River, rising in a small lake bearing the title of Gaz Kul, and flowing somewhat south of west toward the Indus. Close to this Gaz Kul, even if not occasionally united with it, is another small lake, from which issues the Karambar River, which with the Gilghit and Hunza Rivers, join the higher course of the Indus, where it flows toward the west, before bursting through the Himalayas. The western part of this Indus-draining region is known as Chitral, and is situated at an average elevation of 5200 feet on the southern slopes of the Hindu Kush, amid spurs from fourteen to twenty-five thousand feet above sea level. On the south it is bounded by the petty States of Asmar and Dir. The valley is reputed to be very fertile, and is said to have a population of a hundred and fifty to two hundred thousand, without reckoning the Bushgali Kafirs. The Mehtar or Badshah of Chitral, is said to be able to bring into the field 6000 fighting men, all careful marksmen. Chitral, about 150 miles from the town of Gilghit, is an aggregation of six large villages situated along the river, which in the Geographical Journal is called the Kashkar. The names Yarkhun and Kashkar seem to be identical with the Yarkana and Kashgar of Chinese Turkistan.

Mr. and Mrs. Littledale reached the Pamir region via the Russian Trans-Caspian railway. The route from Samarkand to Marghilan, the capital of Kokhand, is described as an alternation of barrenness with gardens of Eden. Continuing southward, they followed the Gulcha River and crossed the Alai plateau over the Little Alai range. Through the passes of Taldik (11,600), Shart (12,800), Terek (over 12,000), Kalin Art (10,800) and Kizil Art (14,200), they reached Kara Kul Lake, and then, after encamping within sight of Lake

Yashil Kul, crossed the Great and Little Pamirs, and proceeded through Baroghil Pass to Chitral, Darkot and Yasin, whence they made their way to Gilghit. From the Great Pamir they enjoyed a view of magnificent mountain peaks over 20,000 feet high. They describe the Pamirs as flat valleys, with lakes having low shelving banks; barren areas with little grass. In Chitral the climate was much better, the warmth and the abundance of apricots contrasting sharply with the barren coldness of the Pamirs.

D. W. Freshfield thus speaks of the Pamirs, after stating that the different strips of table-land form a district 280 miles long, from 120 to 140 wide, and twelve thousand feet high, "tent-shaped glacier-covered mountains divided by broad easy gaps, bare heights naked of verdure and shorn of forests by bitter winds and frosts; desolate lakes, a region which for the most part has neither fuel nor food; an Engadine of Asia, with nine months of winter and three months of cold weather; the home of wild sheep and that of a few wandering shepherds; nomads' land if not no man's land." The Chinese name for the district signifies the "half-way house to heaven," while the word "Pamir" appears to be a Turki term for a plateau. Grombchevsky gives a more favorable account of the district. Wakhan, Shignan and Roshan are at present claimed by the Amir of Afghanistan. Mr. Younghusband found his way to Hunza in 1889 and to the Pamirs in 1890. Between Leh and Hunza, or Kanjut, four passes, from 17,500 to 18,500 feet high, must be crossed, amid glaciers and the grandest scenery. The home of the robber Kanjuts, or Hunza, (in which latter name some think to find the origin of the Huns), is eastward of Chitral. The villages of the Hunza are stone-walled forts, the entrance into which would be difficult if resisted. The sovereign, who made his way to power in good old Oriental fashion, by the murder of his relatives, owes allegiance to the Maharaja of Kashmir. The Taga-dumbash Pamir descends as low as to 800 feet.

Another recent traveller in this region is the Frenchman Dauvergne, who entered by Srinagar and Leh, over the Karakoram Pass to Sanju Kurgan, took a new route to the sources of the Oxus, crossed Baroghil Pass into Chitral, and then through unexplored passes found his way into Karambar Valley, and via Gilghit back to Srinagar. Beyond Kilian Pass (17,450), at Namelong, Dauvergne turned west and reached Kugiar Valley by the following passes, Namelong (12,140), Saraghar (13,250), Tuslar Dawan, (14,500), Tupa Dawan (15,400), (a great opening in a chain parallel to the Kuen Lun, not yet marked on the maps, with peaks sixteen to nineteen thousand feet in height); Sanich

Dawan (16,170), and Kichokin Dawan, a double pass, 15,300 feet above sea level. The Tisnaf Valley, Egisarak Kurgan, where copper is found, the village of Langar on the Zarafshan, an affluent of the Yarkand, are other points in his journey. He followed the Zarafshan to its junction with the Tung, and then turned S. S. W. to the plateau region, where he reached 16,350 feet. According to him, the real sources of the Oxus are those of the Panjah. The difficult Karambar Pass was crossed with ten horses.

Australasia.—THE GLACIERS OF SOUTH NEW ZEALAND—The glacier region of the southern island of New Zealand has been to a great extent explored during the last thirty years. The smaller glaciers, which lie north of the larger, were first visited, the earliest visit to the latter being that of Sir J. von Haast in 1862. After his exploration of the headwaters of the Godley and Tasman rivers, came the visit of E. P. Seely between 1867 and 1870. Little more was done until 1882, when the Rev. W. S. Green almost ascended Mt. Cook, the loftiest peak of the region (12,349 feet). Dr. Lendenfeldt followed next year, and ascended Hochstetter Dome (9,258 feet). Since that year many ascents have been made by G. E. Mannering, Dixon, Johnson, Inglis, Brodrick and A. P. Harper, the contributor of a notice to the Royal Geographical Society. From the account and accompanying map it may be gathered that there is a great difference between the conditions, character and scenery of the eastern and western parts of the range. The glaciers of the east slope descend gradually from elevations of 5,300 to 8,600 feet to their terminations, 2,354 to 2,882 feet above the sea; the comparatively flat surface of their ice is hummocky, and for about a quarter of the length of the glaciers is covered with a considerable quantity of rough moraine; the old lateral moraines of these eastern glaciers are also distinct, especially that of the Hooker glacier, where in one part there are no less than five. On the Mackenzie plains terminal and lateral moraines have been followed for forty miles. The glaciers of the east slope have been tolerably well explored; the principal ice sheets are Tasman, 18 miles long, 1.25 to 2.14 wide, and covering 13,664 acres; Murchison, 5,800 acres, and eleven miles in length; Müller, 3,200 acres, and eight miles in length; and Hooker, 2416 acres, and seven and a quarter miles long. North of these lie the Classen glacier of 1,707 acres, 4.70 miles long, and Godley glacier, covering 5,312 acres, extending over eight lineal miles. The Aletsch glacier of Switzerland is fifteen miles by about a mile, and thus is inferior in dimensions to the Tasman glacier.

The western slopes have not yet been thoroughly explored, but it is known that they are subject to a very large rainfall, amounting to about 120 inches against 25 or 30 on the eastern slope. Though Mt. Cook is nearer to the equator than Switzerland, the glaciers descend some 3,000 feet lower than in that country. The Fox glacier, indeed, on the western slope, descends to 700 feet, and one or two others to less than 1,300 feet. These western glaciers are steep ice-falls to a short distance from their terminations, and their surfaces are almost free from moraine stuff—in consequence of the steep dip and smooth surface presented by the rock strata on this face, as compared with the jagged edges on the east slope. The lower parts of the Fox glacier, and of some others on the west, is overhung by tree-ferns and bushes growing almost on the moraine, and near to the terminal face of the Fox issues a hot spring with a temperature of 100°. A phenomenon of the same kind, on a larger scale, occurs at Mount Ruapehu (9,100 feet) in the northern island. This mountain is covered with snow and ice to the summit, where is situated a boiling lake, into which the ice melts.

These glaciers seem on the whole to be receding, especially those at the head of the Rangitata River, but last year the Müller advanced so as to dam up the Hooker River, and the Ball glacier is certainly advancing. The daily rate of flow varies; on the Ball it is from ten to eighteen inches, on the Murchison from 2.6 to 8, on the Hooker very slight, on the Müller from 3 to 12.

In 1890 Mannering and Dixon discovered that the loftiest peak, Mt. Cook, was not situated on the main range, but on its eastern side, so that it sends no water to the west coast. The next most lofty peaks are Dampier (11,823), Tasman (11,475), and a peak which bears no title on the map, though it reaches the altitude of 11,844 feet. There are several other summits that attain above ten thousand feet. The writer states that he has not seen vegetation at above 6,200 feet, and that 6,500 may be considered the highest limit. The flora is not so varied as that of the Swiss Alps.

Europe.—THE CAUCASUS.—The Caucasus still continues to be a favorite region for Alpine exploration by English and other clubs. Mr. D. W. Freshfield, himself an ardent climber, from time to time contributes a note to the Royal Geographical Society. In one of these it is mentioned that new maps show in the central Caucasus one peak over 15,000 feet, nine over 14,000, and five others over 13,000, also that in Suanetia four elevations of more than sixteen thousand feet are known, two over 15,900, three more over 15,000, and three over 14,000.

The Ossete villages, built upon summits, are stated to abound in interesting antiquities.

The Black Sea.—A hydrographical exploration of the Black Sea, recently conducted by the Russian Government, has proved that the waters of that large area exist under anomalous conditions. The 100 fathom line follows the coast outline closely save in the north-west where it crosses with a slight northern inflexion, from Varna to the Crimea. From this the bottom descends at the tolerably steep gradient of twelve degrees to a depth of 800 fathoms, and from thence with a slighter inclination to 1,200 fathoms. The 1,200 fathom line encloses an oval in the center, with 1,219 to 1,227 fathoms as its greatest depths.

The upper stratum of twenty-five fathoms changes in temperature with the seasons; between this and 100 fathoms the coldest water, as low as 44° is found, while below 100 fathoms the constant temperature is 48°. In August the upper surface of the cold layer sinks to from thirty-five to fifty fathoms. The vertical circulation of the water is limited to the upper one hundred fathoms, and there is no trace of organic life below this level. The lower layers contain much sulphuretted hydrogen, besides sulphates of alkaline and earthy metals, yet the principal reason of the absence of life is probably the deficiency of oxygen in a dissolved state. The bottom from ten or twenty to a hundred fathoms is covered with a light gray mud; from 100 to 800 fathoms the mud is dark gray, and at greater depths it assumes a bluish tint through the prevalence of carbonate of lime. Remains of brackish water mussels, of which species some still live in the Caspian, while others inhabit the rivers flowing into the Black Sea, are found at depths of from one to six hundred fathoms. It has been assumed that at the beginning of the Quaternary and end of the Pliocene periods, the Black Sea was a brackish lake, without any communication with the Mediterranean, and that at the end of the glacial period the very salt waters of the Mediterranean bursting in through the newly opened Bosphorus, accumulated at the bottom, prevented circulation, and annihilated the brackish water fauna.

The Mediterranean.—The depths of the eastern Mediterranean have been explored by the Austrian expedition in the *Pola.* A depth of 4,400 metres was found in 35° 44′ 20″ N., and 21° 44′ 50″ E. long., at a distance of only about fifty knots from Cape Matapan. A few miles farther eastward 4,080 metres was found—these are the greatest known depths in the Mediterranean. Between Candia and Alexandria 3,310 metres was found twenty miles south-east of Grandes Bay, and this depth gradually diminished to the east, to 2,120 metres near Alexandria.

The Polar Regions.—DR. NANSEN'S VOYAGE.—The opening article of the Geographical Journal for this month is a reprint of the address read before the Royal Geographical Society on November 14, 1892, by Dr. Fridtjof Nansen, the adventurous traverser of Greenland, and the daring aspirant to the honor of reaching the North Pole by drifting with the currents.

Of the existence of these currents ample proofs were adduced in the course of Dr. Nansen's speech, but of their sufficiency, their regularity, as well as of the character of the region to be traversed, whether largely open ocean, or whether cut up into intricate channels by a maze of islands, the bold argonaut could not say anything convincing.

As proofs of the general course of the currents, Dr. Nansen stated that ships turned back by floe ice drifting southward were carried between Greenland and Spitzbergen, through which passage he estimated that in every twenty-four hours a startlingly enormous quantity of water passed southward; also that other southward currents ran through Smith, Jones and Lancaster Sounds; and that undoubted relics of the unfortunate Jeannette were picked from a floe at Julianehaab three years after she sank near the New Siberian Islands. He believes the regions around the pole to act like an enormous pump, sucking in the water from Bering's Strait and East Siberia, and returning it by the Greenland Seas. Among other facts, he mentioned that several years ago, a throwing-stick of a peculiar form used only by the natives of Port Clarence, Norton Sound, Alaska, was found near Goathaab on the west coast of Greenland, also that the driftwood which reaches every year the shores of Greenland and Spitzbergen, is the timber of American and Siberian species. At the New Siberian Islands the ice is thin, while on the east coast of Greenland it is thick, and the speaker maintained that it grew in bulk as it drifted across the pole.

Specimens of mud, collected by Nansen from floes between Iceland and Greenland, had been examined by Dr. Tornebohm, of Stockholm, who had come to the conclusion that it consisted of mud from the great Siberian rivers. Dr. Cleve, of Upsala, had also examined the dust from the snow of these floes, and had identified sixteen species of diatoms, all of which were known to be found at Cape Wankarena, near Behring Strait, and twelve of which were only known from there. The pumice abundantly strewn on some parts of the shores of Norway, Spitzbergen and Greenland, is stated by Bäckström to be andesitic, and must therefore have been derived from some andesitic volcano near Bering Sea—this proves a post glacial communication. A great deal of this pumice is now, probably on account of the rising of the land, at from thirty to seventy feet above sea-level.

In order to guard, as far as possible, against the danger of being crushed in the solid ice, a ship of small size and great strength, yclept the *Fram*, has already been built. She displaces about 600 tons, is large enough to accommodate twelve men with food and fuel for five or six years, and has engines of 160 horse power, enabling her to steam some six knots hourly. The sides slope from bulwarks to keel, so that the pressure of the ice may tend to lift her out of the water (as occurred in the case of the *Tegethoff*) ; she is broad in proportion to width, pointed at both ends, flat-bottomed near the keel, which is almost covered by the boarding, and has a considerably curved stem. A special point is the arrangement for raising the screw clear out of the water —two reserve screws are to be carried. The sides are planked with pitch-pine, oak, and greenheart to a total thickness of over twenty-eight inches. The length at water-line is 113 feet, and the sailing speed is reckoned at from 8 to 9 knots. The *Fram*, or Forward, was launched at Laurvik, October 28, 1892, and will start on her hazardous cruise in the Spring. She has ten boats of various kinds, including two specially large and strong, intended for the homeward voyage in case the ship should be crushed; a dynamo will also be taken.

The reading of this paper was followed by a long discussion, in which various objections were brought forward by distinguished Arctic navigators. Some of these were successfully answered by Dr. Nansen, who, however, seemed inclined to follow the advice of Captain Wiggins, and to start by way of the Kara Sea, rather than from the New Siberian Islands. Sir George Nares pointed out the danger of disregarding the usual maxim to keep close to shore, and said that several years would be required for the drifting, during the whole of which time the vessel would be in danger. A vessel frozen-in became a solid block with the ice. He accepted the homing current as proven, but doubted the existence of the out-going one, or at least its power to overcome the force of the winds. The largest fresh-water rivers lost all influence at a distance of 200 miles from their mouth. The *Fram*, he said, could not at best expect to reach more than sixty miles north of 76° 30′ before meeting with the ice-pack, and would thus be frozen-in 730 miles from the Pole and 600 from the home current. He believed that the wind would be more likely to drift the vessel to the west than to the east.

Sir A. Young said that the greatest danger arose from the land. The remains of the Jeannette had probably found their way through narrow channels, in the course of years. He considered the fact that a tame reindeer had once found its way from Siberia to Upernavik, in Greenland, proved the existence of land. The advice of Captain Wiggins was not to wait for a squeeze, but to endeavor to run the vessel on to the top of the ice.

To all these Dr. Nansen answered by a declaration that, as he had abandoned his ships to cross Greenland, so he meant to abandon the coast to reach the Pole; he believed that the winds acted with and caused the currents.

Admiral Sir G. H. Richards, in a written communication states his belief that the enormous ice-cap of the pole, and the weight of snow, cause an outflow in all directions. Solid ice north of 78° is his conception of the Arctic.

Finally Sir J. D. Hooker writes a word of earnest warning. The lines of a ship may be of use in an open pack, but not when forced against land, amongst floes and bergs, or when the vessel is on her beam ends. He then enlarges upon the depressed spirits produced by the long confinement in close quarters, ever in prey to a haunting uncertainty, to say nothing of the risk of scurvy.

General Notes—The Geographical Journal, the first number of which appeared in January, can scarcely be called a new magazine, since it is but the well-known " Proceedings of the Royal Geographical Society " in a new dress, a dress which will, it is hoped, tend to popularize the study of Geography, and thus gain for itself a wider circle of subscribers than was reached by the " Proceedings." One of the most noticeable new features is the more extended reviews of recently issued books, printed in the same type with the principal articles.

Before the outbreak of the war with Chili, a Geographical Society had been founded at Lima, by D. Manuel Pardo. This was broken up by the war, but was again started on April 15th, 1891. The first volume of the " Proceedings " contains much of interest; among other things an article on the phenomenon known as the " Callao Painter," by S. Raimondi, and others on the River Purus, the geology of Huanta, and on the subsidence of Lake Titicaca. The president is

D. Louis Carranza, a physician and a close observer, the secretary of the philologist, G. P. Zegarra.

Among well-known geographers who have passed away during 1892 may be mentioned Bates, the "Naturalist on the Amazon"; Grant, Speke's companion to the sources of the Nile; Lord Arthur Russell, Professor Moseley, and Sir Lewis Pelly, who, while stationed at Bushire, adventurously penetrated in British uniform to the stronghold of the fanatical Wahabis. This was in 1865. At Riyadh he met the blind Saiyid Amir, and was allowed, in appearance, to depart in safety, but on their homeward march the party found that their water-bottles had been poisoned, and suffered agonies of thirst, the only refreshment they could gain being to pour the water over their wrists.

In an address delivered before the Berlin Geographical Society, Professor J. Walther compares the desert regions of America with those of Africa, and finds the similarity greater than is generally supposed. Both are characterized by four distinct types of denudation, gravel beds, sand-dunes, loam regions and salt deposits. In both the mountains rise out of the plains like so many islands, without any intervening debris, and in both the "amphitheatre" formation is common. Both exhibit the denudating powers of heat and dryness, the first splitting the rocks into fragments, while the dry winds whirl the dust into heaps. No doubt water, even here, is the chief agent, but it has not more than sixty days in which to accomplish its work. The chief difference between the American arid lands and those of North Africa is the steppe vegetation of the former.